EFFECT OF GAMING ON THE TEACHING OF PHYSICS

A DISSERTATION
SUBMITTED TO M.D UNIVERSITY, ROHTAK
IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF EDUCATION

1986-87

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The whole work is original and is worthy of presentation to the Maharshi Dayanand University, Rohtak in partial fulfilment of the requirements for the degree of M.Sc. of Education, 1986-87.

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ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to my supervisor Dr. R.C.Hooda, Lecturer, School of Education Maharshi Dayanand University, Rohtak for his excellent guidance, constant encouragement and valuable suggestions.

I owe my regards to Dr.J.C.Sharma, Director, School of Education, M.D.University, Rohtak for providing me necessary facilities.

My heartfelt thanks are also due to my teacher's Dr. D.R.Chadha and Dr. B.S.Dagaur, for their generous help when ever needed at various stages of this investigation.

I am greatful to SH. S.D. Gulati & MRS. INDU BALA Principals of Vidya Bhawan High School, Rohtak & Shiva High School, Rohtak for their cooperation and help when ever needed at various stages of this investigation.

I also acknowledge my debt and warm expression of thanks to the students of these schools whose cooperation, interest and participation in the work made this study a success.

I am also very thankful to Mr. Harish Kumar and Mr. Mahesh Grover of Harish Type College, Rohtak, for typing out this dissertation in time.

Rita Grover.

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INTRODUCTION

CHAPTER - I

INTRODUCTION

The destiny of India is being shaped in her class-rooms (Education Commission, 1966). The shape, undoubtedly, will depend on what goes on in the classrooms and how does it go on? In other words, quality of teaching will be determined by quality of teaching behaviour featuring the classrooms. The quality of teaching behaviour, in its turn, depends upon the level of equipment of teachers with necessary skills in designing and handling teaching behaviour. This can be successfully accomplished through understanding teaching behaviours, their effectiveness in terms of corresponding pupil outcomes and their adoption by the master designer and architect- the teacher.

The innovative idea of teaching strategies for improving teaching repertoire has gathered great strength over the past ten years. Now we believe that teaching is emanating from the behaviour of the teacher and it has to be evaluated in terms of learning-outcomes as teaching and learning are complementary processes. Learning to learn is not just a slogan. It denotes a specific pedagogic approach that teachers must themselves master if they want to match learning experiences to the requirements of the learner.

Teaching is an interactive process the formation of which consists of the interchange of ideas, information, observations and point of view between a teacher(s) and an individual or individual and a group called learners. If the teacher is to adopt and restructure the learning experiences to meet

the observations, interests and capabilities of the learner, his approach to teaching should be in relation to objectives of teaching, nature of learner and nature of content. All this requires training for effective teaching as a pre-requisite condition. Therefore, training for effective teaching has become a fundamental goal underlying teacher training programme.

Measure of effective Teaching startegy is the teaching learning outcome which in turn is the function of interaction between the teacher, content and the learner. Here teaching is not talking alone and learning is not listening alone. Teacher and Learner must be active in manipulating the system of objects and/or organism of interest so that inherent regularities in the experience can be discovered.

Through out the history of education many efforts have been made with a view to improve teaching by rethinking and restructuri ' What was to be tought (Content) : 'How it can be tought (Methods and what strategies can be used for successful teaching. We think of ourselves as professional teachers and educators in a sense as we are responsible for many types of instructions for helping our students grow in self awareness and in their ability to relate to others, for clarifying values, for promoting moral development.

Our responsibilities can be described in three categories : responsibility for the personal growth of our students, responsibility for their social development and preparation for national and world citizenship and responsibility for their mastery of academic subjects. In order to accomplish these objectives

we work in schools, and within those in classrooms, learning centers and libraries.

To carry out these multiple responsibilities, we are required to engage in several professional roles, often simultaneously. We are counselors, facilitators, instructional managers, curriculum designers, academic instructors etc. To fill these roles, we draw on a variety of models of teaching.

Teaching model is " a pattern or plan, which can be used to shape a curriculum or course, to select instructional materials and to guide a teacher's actions." A model of teaching consists of guidelines for designing educational activities and environments. It specifies ways of teaching and learning that are intended to achieve certain kinds of goals.

What is to be done and how it is to be done in the process of teaching is pre-planned and well thought in viewff the teaching goal. Teaching is an interactive process the formation of which consists of the interchange of ideas, information, observations and point of view between teacher(s) and an individual or individual and a group called learners.

Marsha Weil and Bruce Joyce have grouped the models on the bases of educational goals in to the following four families:-

1. Information Processing Models.
2. Social Interaction Models.
3. Personal Development Models.
4. Behaviour Modification Models.

Among the social interactions model's-the simulation model or Game enjoys a prominent place. A simulator isa training device that represents reality very closly. Games permit the

students to learn from self-generated feedback thatthey experience themselves.

GAMING :

Game is a new term in the sense that it is linked with simulation in the literature on training technology. Simulation is an attempt to 'give the appearence or/and effect of something else.' By implication, educational simulations has the model of reality which is manipulated by the learner in orde to learn. When an element of competition and chance is added to this, it becomes a game and the technique gaming.

Gaming teaches systematic understanding which is difficult or impossible to measure with traditional pen and pencil short-answer tests of the sort that have often been used to measure comparative learning with different techniques. Games bring motivations and interest, effective learning.

THE VALUE OF GAMES:

Gaming is a training device that represents reality very closely, but in which the complexity of events can be controlle

The advantages of gaming are several. The learning tas can be made much less complex that they are in the real world. Example of this is the flying of an airplane. To learn how to fly a complex airplane without the aid of a simulator, the student pilot has to do everything first time. With the use of a simulator the training can be staged. The trainee can be introduced to simple tasks, and then more complex ones. Also, difficulties of various kinds can be simulated, such as storms

and mechanical problems, and the student can learn how to cope with them.

A second advantage of gaming is that they permit the student to learn from self-generated feedback that they experience themselves. He can learn through his own senses, rather than simply through verbal description.

Educational gaming enable students to learn from the simulated experiences built into the games, rather than from the teacher's explanations or lectures.

The student can best learn from a simulation game. Although this is likely to vary from game to game and perhaps from teacher to teacher. We can distinguish certain sources of student learning. First, students may learn directly as a result of their experience in the simulation. Students may also learn as a result of activities that follow a game that are used to exploit their experience in the game. The simulation, in effect, generates a universe of experience that can be compared with the real"world", more accurately the students can compare their experien in the game with what they believe to be true about the real world.

Learning about competition : In gaming, the students learn about competition. Competitions make the experience an exciting one. As gaming provides opportunities for the students to speak, to participate, to initiate etc.

Learning Co-operation: Students learn feeling of co-operation through gaming.

Learning about Social System: Students are not only actin out another person's role, but are also learning about the social system or process being modeled.

Learning Concept : Games are uniquely fitted to convey conceptual knowledge. Students learn about teaching concept

Learning to think critically: Games expose students to the [illegible] [illegible] of analysis and judgement involved in decision making.

Learning Skills: Students also learn some of necessary skills for attaining their objectives.

Teaching is a two way process i.e. in teaching, the students and teachers both are involved in the gaming process. Hence gaming provide, more benefits to both teachers and students

GAMING AS THE MODEL OF TEACHING :

1. Syntax of the model

Simulation has four phases.

Phase one-Orientation - presents the broad topic of simulation and the introduction of the concepts.

Phase two - Training of the participants - involves setting up the scenario (rules, roles, procedures, scoring, types of decisions to be made and goals).

Phase Three - The actual simulation - includes feedback on the evaluation of the environmental stimuli and behaviour adaptions that are necessary in reaching the goals.

Phase Four - the participant debriefing - guided by the teacher, the students summarize the events of simulation and their difficulties. They are asked to compare the simulation to the course content and/or the real world. Finally they are provid the opportunity to appraise and redesign the simulation.

2. Principles of Reaction: The reaction of the teacher are those of a facilitator. Throughout the simulation, he or she must maintain supportive attitude. He must direct the group to "get on with the game."

3. Social System: The ultimate success of simulation, infact, depends on co-operation and willing participation of the students. The social system should be non-threatening and marked by co-operation.

4. Teacher's Role: The teacher's role in using an educational simulation is one of explaining, refereeing, and coaching.

Explaining the Game: It is not essential, that students have a complete understanding of game at the start. Thus repeating the rules of the game and drilling the students is unnecessary ; instead, the explanation of the game should be kept to a minimum.

Refereeing (Controlling) the Game: The teacher's contr should be like that of a referee who enforces game rule but does his best not to interfere in the game activities.

Coaching the Game : As a coach, the teacher should be a supportive advisor, not a preacher or disciplinarian.

Discussing the Game: During the game the teacher should explain, referee and coach. After the game the teacher should be certain to lead the class in discussing how closly the game simulates the real world; what relationships can be discovered between the simulation and the subject matter that th game was meant to supplement. The class might also suggest ways to improve the game.

Support System: Simulation requires support material ranging from simple teacher made games, to marketed games. Simulations are gaining in popularity.

SIGNIFICANCE OF THE PROBLEM

Today tremendous growth has taken place in all spheres of educational activities. New innovations and discoveries are taking place in every sphere of knowledge and all these require a spirit of developing logic, critical thinking, increasing reasoning ability, to show high achivements and attainments in all fields. So games seems to be one of the most important model of social interactions model family. This field is yet to be explored and much less reasearch work has been done in this field. In this area of gaming Ramesh Chander Sharma has done some research work on the topic of Effect of Gaming on the Teaching Of Chemistry during the year 1985-86.

So in the present study, I propose to study the work ability of games on the Teaching Of Physics.

STATEMENT OF THE PROBLEM

The problem for the present investigation is stated as follows:

Effect Of Gaming on the Teaching Of Physics.

DEFINITION OF THE TERMS USED

One significant term used in the statement is Gaming. It is a new term in a sense that it is linked with simulation in the literature on training technology. Simulation is an attempt to ' give the appearance or/and effect of something else By implication, educational simulations has the modle of reality which is manipulated by the learner in order to learn. When an element of competition and chance is added to this,

it becomes a game and the technique gaming.

The term gaming is used in various ways. The investigator follows the academic gaming. These are currently very popular in India. Some specific type of gaming used are on the television e.g. Quiz time, Quest - a programme produced by Calcutta Doordarshan, on the spot programme etc. These all are examples of gaming.

The other term used in this correction is Achievement. This is something gained by someone in his field. Various people show achievements in various fields such as science and technology, sport, academic, adventures etc. This can be measured with the help of achievement test. These achievement tests are employed for measuring the amount of success of achievement of individual in specific field or area of accomplishment in the school situation. An achievement test is used as a tool for measuring the nature and extent of student's learning in a particular subject or group of subject. How far a particular student has been able to learn and acquire or has been benefited from the learning experiences given to him is ascertained with the help of these tests.

OBJECTIVE

The main objective of study is as follows-

To Study The Effectiveness Of Gaming and Lecture Method inrelation to pupil achievement in Physics.

HYPOTHESIS:

The students tought Physics through gaming will show significantly higher achievement than the students tought Physics through lecture method.

DELIMITATIONS OF THE STUDY

The study has a number of ramification but due to limitations of time and resources it was delimited in several aspects:

1. The study could be conducted on several classes but it has been confined only to IX class only.

2. The training exercises in gaming could be extended for a longer period but the duration of the experiment was delimited to three weeks only.

3. The training exercise in gaming could be given on many chapters of Physics but the study was delimited to two chapter only.

4. The sample has also been restricted to 62 pupils only as the study involved lot of observations followed by systematic feedback. But this by itself is a restraint imposed by the investigator.

DESIGN AND PROCEDURE

CHAPTER II

DESIGN AND PROCEDURE

DESIGN

In this study, for the achievement of objectives, Pre-test and post-test control group design was employed. Two parallel groups were made, one was called experimental and other control group. The study was carried out in three stages. First stage involved testing student's achievement in Physics, in both the groups pre-test stage. The second stage was the treatment stage of teaching two chapter of IXth class students. Teaching of Physics through gaming was the experimental treatment while, the control group was taught through lecture method. Third stage was the stage of Post-testing. Here the achievement of students in Physics was tested in both the groups after the completion of the experimental treatment.

The scheme can be presented as in table No. 2.1.

Table 2.1. DESIGN OF THE STUDY

Stage	Experimental group	Control group
1. Pre-test	Measurement of achievement of student's in Physics.	Measurement of achievement of students in Physics.
2. Treatment	Teaching Physics through gaming	2) Teaching Physics through lecture method.

3. Post-test	1. Measurement of pupil achievement in Physics.	Measurement of pupil achievement in Physics

VARIABLES

The various variables which influenced the study i.e. independent variable and the control variable have been summarised in table 2.2.

Table 2.2. VARIABLES

Independent variable	Dependent variable	Variable control	Control employed
1. Method of teaching through gaming & lecture method	1. Achievement	1. Class to be taught 2. Subject to be taught	1. Administra ion (only 10th class to be tau 2. Administra tive (only Physics to be taught) 3. Administr ative (ign anc about the experiment)

SAMPLE

The smaple consisted of 52 studying in two section of 10th class of Vidya Bhawan High School, Rohtak & Shiva High School, Rohtak. One section was the control group and other was the experimental group.

GAMING IN PRACTICE

*1. GOALS OF THE GAME (GENERAL GOALS)

1) To give the students a mental exercise on the topic in hand.

2) To help them learn in play way mood.

3) To develop healthy competition.

4) To make them arrive at group decisions.

5) To make them work under given rules and challange the unsuitable ones.

6) To develop cooperative spirit in working with the team.

2. IDENTIFYING AND DISCUSSING THE GAME :

(a) Name: SCI. [illegible]

(b) Developer:- Rita Grover

(c) Materials provided

1) Books and Cyclostyled notes.

2) Rules and Regulation.

(A) Rules for players

1) Total time may be 40 minutes.

2) Time for throwing the question is I minute.

3) Maximum time for answering is 2 minutes.

4) For answering one question each team can confer among themselves.

5) Both the teams will have to accept the decision of judges regarding the correctness or incorrectness of the answer, which will be final.

6) A mark will be given for the correct answer of the question.

7) If the team to whom question is thrown fails to answer, then the other team will have to answer and for correct answer a bonus mark will be given to it.

8) If both the team fail to give the answer, then the judge will explain the answer of that question and no mark will be given to the players.

9) Only one member of the team will have to answer i.e. one team will be allowed only one attempt for answering.

(B) RULES FOR THE RECORDERS:

1) He will keep the record of the marks obtained by both the teams.

(C) RULES FOR THE TIME KEEPER

1) He will ring the bell at the end of one minute to give a warning signal and at the end of two minutes to give a signal of closure.

(D) RULES FOR THE SCORER

1) He will have to vigilent in alloting marks to the correct answers given by the team.

2) The scores will be put on the score board simultaneously, so that the teams canbe aware of their performance.

(E) RULES FOR THE JUDGE/ORGANSER:

1) The organiser will announce the topic one day in advance.

2) He may consult the books to judge the correctness of the answer.

3) Judges will listen to the challange of the teams and will take suitable decisions.

(F) RULES FOR THE OBSERVERS

1) Obervers will be silent throughout the game.

2) They may clarify their doubts only at the end of the game.

(G) SKILLS DESIRED AMONG THE STUDENTS

1) Comprehension

2) Knowledge of rules

3) Sharpness in answering and quick thinking

4) Group discussions.

(3) TIME REQUIRED FOR THE ACTIVITY:

40 minutes

(4) SKILLS DESIRED IN THE TEACHER

1) He will facilitate the players' understanding and participation & interpretation of the rules.

2) He will encourage participation.

3) He will keep the game going(" get on with the game") when Players digressed or become bogged down.

4) He will maintain rules when necessary.

(5) IDENTIFYING AND DESCRIBING THE ROLES

The teacher or the organiser will assign roles of scorer, recorder, time-keeper, players, observers etc. democritically.

(6) LEARNING OBJECTIVES OF THE GAME

1) To help them develop knowledge and understanding of important formulae and concepts in PHYSICS.
2) To help them develop skills in evaluating the correctness of the answer and interpretting the responses.

(7) PARTICIPANT TRAINING:

The teacher will explain the game rules, roles, procedures, scoring to the students. He will provide practice session to the students.

(8) PLAN OF GAMING

1) Devided the experimental group into two teams A & B.
2) 5 students were in each group.
3) They were made to sit in face to face position with the judge in between them.
4) Most of the students were made to sit along the back benches and advised not to speak during the gaming.
5) Roles of scorer time keeper etc. were alloted to some students.
6) Question No. 1 was asked to team A and then to team B and so on.
7) After the gaming in over, scoring was done and winner announced.

TOOLS

The tools used were:

ACHIEVEMENT TEST:

Achievement test attempt to measure what an

individual has learned-his present level of performance. To measure the achievement of the students in physics, an achievement test was constructed by the investigator. The items with wide range of difficulty were constructed and these were 70 in number. The major steps in constructing an effective class room test may be summarised under 3 headings (a) planning the test (b) item writing and (c) item analysis. Now when 70 item were prepared, then at this TRY- OUT - STAGE some modifications came to light. Here instructions to be given to the students were framed. This test was administered to the students and answers were checked. A scoring key already prepared by the investigator helped in the scoring. There was one mark for a correct answer and no mark was awarded for incorrect or wrong answer. Then item analysis was done.

Although there are various methods but the investigat followed Anastasi's method and items with moderate difficult value and discriminative value were collected. Following this way, 50 items were finalised for final achievement test.

EXPERIMENTAL PROCEDURE

STAGE - I

PRE-TEST STAGE : It is first stage and here Achievement test was administered in both the experimental and control groups.

STAGE - II

EXPERIMENTAL TREATMENT STAGE:

After administrations of the achievement of the

test teaching of Physics through gaming was experimental treatment. Two chapters of Physics for class 10th were selected for gaming to two the experimental group. The two chapters were:-

a) Structure of Atom

b) Laws of Motion.

These 2 chapters were taught to the control group by the investigator by following the lecture method as these two chapters were taught to the experimental group through gaming. The lesson were taught in the school period of 40 minutes. The investigator himself has prepared some gaming exercises. These questions almost covered the necessary matter of the chapters. The following four phases were followed while teaching the experimental group through gaming.

1. PHASE-ONE

Orientation - presents the broad topic of gaming and introduction of concepts that will be incorporated in the action.

2. PHASE-TWO

Training of the participants - involves setting up the scenario (rules, roles, procedures, scoring, types of decision to be made, and goals) and role assigmments

3. PHASE-THREE

The actual gaming- includes feedback on the evaluation of environmental stimuli and behavious adaptation that are necessary in reaching the goals.

4. PHASE-FOUR

The participant debriefing- guided by the investigator and students summarises the events of the gaming and their perceptions, difficulties and insights.

STAGE-III POST-TEST STAGE

At this stage, after the completion of the chapters by both the experimental and control groups, the achievement test was administered in both the group.

STATISTICAL ANALYSIS:

Statistics has become an indispensable tool for researc It is fundamental to the proper analysis of data and investigation of a complex phenomenon. The main statistical techniques employed are briefly discussed below:-

't'-Test In research work the determination of whether an observed difference is of such magnitude that it can not be attributed to chance factor or sampling variations, is of great importance. A mere quantitative superiority of the experimental group mean score over the control group means score is not the conclusive proof of its superiority. The test of the significance of the difference between two means is known as 't'-test. It involves the computation of the rati between the experimental variance (observed difference between the two sample means) and error variance (the sampling error factor).

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}}$$

Where M_1 = Mean of experimental sample

M_2 = Mean of control sample

N_1 Number of cases in experimental sample

N_2 = Number of cases in control sample

σ_1^2 = Variance of experimental group

σ_2^2 = Variance of control group

After calculating the 't' value, as the investigator has applied directional hypothesis, we apply here one tailed test and the and the value of 't' obtained is seen at 0.10 and 0.02 level of significance from the tables.

RESULTS, INTERPRETATION
AND
DISCUSSION

CHAPTER - III

RESULT, INTERPRETATION AND DISCUSSION

INTRODUCTION

This chapter includes the results related to the objectives of the study i.e. to study the effectiveness of gaming and lecture method in relation to pupil achievement in Physics. The interpretation of results and their discussion have been introduced in this chapter.

EFFECT OF GAMING ON ACHIEVEMENT OF PUPILS IN PHYSICS

One of the objectives of the present study was to observe effectiveness of gaming and lecture method on pupils' achievement in physics. The analysis of the data were done with the help of 't' test and one tailed test was applied as the investigator has used directional hypothesis. The various result are given in table Nos. 3.1, 3.2, 3.3,.

TABLE 3.1.

TABLE SHOWING SIGNIFICANCE OF DIFFERENCES OF MEANS OF PRE-TEST SCORE OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUP ON ACHIEVEMENT IN PHYSICS.

TABLE 3.1.

TABLE SHOWING SIGNIFICANCE OF DIFFERENCES OF MEANS OF PRE-TEST SCORES OF THE STUDENTS OF EXPERIMENTAL AND CONTROL GROUP ON ACHIEVEMENT IN PHYSICS.

Group	N	M	SD	't' value	Level of significance 0.05	0.01
Experimental	26	21.84	8.31	0.37	NS	NS
Control	26	21.07	6.01			

NS = NOT SIGNIFICANT

It may be observed from table 3.1 that the 't' value of 0.37 for the differences in the mean scores, at the pre-test stage of the students of experimental and control group on achievement in Physics is insignificant at 0.01 level with df. 50. The mean score of 21.84 of the experimental group does not differs so much from that of control group mean score of 21.07 This shows that the achievement shown by both the groups at the pre-test stage is nearly same.

TABLE -3.2.

TABLE SHOWING THE SIGNIFICANCE OF DIFFERENCES OF MEANS OF POST-TEST SCORES OF THE EXPERIMENTAL AND CONTROL GROUP ON ACHIEVEMENT IN PHYSICS.

Group	N	M	SD	't' value	Level of significance 0.05	0.01
Experimental	26	32.46	10.07	3.03	S	S
Control	26	24.85	7.98			

S = SIGNIFICANT

The 't' value of 3.03 from table 3.2. for the differences in the mean scores at the post-test stage of the students of experimental and control group with df 50 is significant at 0.01 level. As the post-test mean score of 32.46 of the students of experimental group is higher than the mean score of 24.85 of the control group students. It indicates that the students of experimental group have scored significantly higher than that of the students of control group, which ultimately may be attributed to the treatment.

TABLE -3.3.

TABLE SHOWING THE SIGNIFICANCE OF DIFFERENCES OF MEAN GAINS OF THE EXPERIMENTAL AND CONTROL GROUP ON ACHIEVEMENT IN PHYSICS

Group	N	M	SD	't' value	Level of significance	
					0.05	0.01
Experimental	26	10.61	3.67	9.30	S	S
Control	26	3.38	1.51			

S = Significant.

It can be observed from the table No. 3.3. that the 't' value of 9.30 for the differences of mean score gains of the experimental group students & control group students with a df50 is highly significant at 0.01 level. Since the mean gain score of 10.61 of the experimental group is higher than the mean gain score of 3.38 of the students of control group, it shows that the students of experimental group have scored significantly higher than the students of control group, which may ultimately be attributed to the treatment given to them.

Here the effect of gaming on the teaching of Physics appears to be very interesting. The experimental and control group did not differ significantly in terms of mean levels of achievement the in Physics at the Pre-test stage. But after the treatment the mean score of experimental group

i.e. 32.46 is significantly higher from the control group mean of 24.85. Also the difference in mean gain scores of experimental and control groups on achievement was note worthy. The mean gain score of 10.61 of the students of experimental group is significantly higher than the mean gain score of 3.38 of the control group and hence this gain can be considered due to the treatment provided to the experimental group.

The experimental group was providedhigher quility of instructions than the control group in the formof gaming exercise, while the instructions given to the control group followed lecture method of teaching.

Hence it is obvious from the above results that the teaching through gaming brings higher achievement as compared to the lecture method of teaching. In other words the teaching through gaming can be a better way of imparting and transmitting knowledge to the students in comparison to the lecture method.

* * *

CHAPTER-IV

CONCLUSIONS AND IMPLICATIONS

INTRODUCTION

On the basis of the result and their discussion given in chapter - III, the following conclusions are drawn. For this, significance of differences on the performance of the control and experimental groups and 't' test values were worked out. These conclusions may be summarised as follows:-

CONCLUSIONS:-

Two parallel groups of pupils were taught Physics. One group through lecture method and the other group through gaming. The group of pupils taught Physics through Gaming have shown significantly higher gain in achievement than the group of pupils taught Physics through lecture method. The students who were taught Physics by using gaming exercise have shown significant improvement in their achievement in the subject as compared to the control group. Hence gaming plays a important role in improving the achievement of pupils.

EDUCATIONAL IMPLICATIONS:

The present study appears to be an initial effort in the area of teaching through gaming since the research references on this aspect could hardly be located whatever be its limitations it has significant implications for resear

in education.

The main conclusions of the study have been presented under captions mentioned above. The educational implications of these conclusions are given below. The present study has implications for teachers, students, administrators and research workers.

1. The present study has been confined to process variable, only it will be useful to study its effects on pupils learning outcomes which is the ultimate objective of teaching.

2. Research in teaching is still in the embryonic stage in this country. Research in teaching through gaming and its trainability is conspicios by its absence. This has emerged as a potential area of research on teaching-learning which if perused, will hold useful data for use in classroom instructions.

3. Training in gaming exercise increases thepupil participati in classroom instruction. Sociometric studies on the comparative pupil participation before and afterthe training are likely to provide functionally useful date.

4. Research on pupil's achievement & perception of teaching may yield rich results if it is studied in the context of what goes on in the classroom before and after the gaming. This

should include the study of both cognitive and effective varriables.

5. Pupil achievement has always a context intimately connected with the teaching patterns. The variations in teaching patterns are caused due to not only subject variations but also due to the individual differences in the teachers. Some teaching patterns are likely to stimulate pupil achievement more than the others. There is a need to conduct a series of researches on the relationship between the teaching pattern and the pupil achievement in the teaching of different subjects.

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SUMMARY

CHAPTER V

SUMMARY

INTRODUCTION

There has been a close relationship between education and society. Teaching is an intimate contact between a more mature personality and a less mature one which is designed to further the education of the litter.

Education affect the total life of a society. Education of any society changes in accordance with its nature. Our responsibilities can be described into three categories, responsibility for the personal growth of our students, responsibility for their social development and responsibility for their mastery of academic subject we are also responsible for many types of instructions, for helping our students grow in self awaraness, for promoting moral development.

Gaming is a training device that represents reality very closely. Gaming teaches systematic understanding. Games bring motivations and interest. The games help in learning about competition, learning co-operation, learning about social system, learning concepts, learning to think critically, learning skills.

Educational simulations enable students to learn from the simulated experiences built into the games, rather than from the teacher's explanations or lectures.

Game has four phases:

Phase one -- Orientation
Phase two -- Training of the participant.
Phase three -- The actual simulation.
Phase four -- The participant defriefing.

Games permit the students to learn from self generate feed back. He can learn through his own senses, rather than simply through verbal descriptions. Gaming is an instrument of transmission of knowledge and creation of desirable attitudes and values. To ascertain the effectiveness of this method over lecture method, the present study has been taken.

STATEMENT OF THE PROBLEM

" Effect of Gaming on the Teaching of Physics."

OBJECTIVE:

The main objective of the study is as follows:-

1. To study the effectiveness of gaming and the lecture method is relations to pupil achievement in Physics.

HYPOTHESES:

The student taught Physics through gaming will show significantly higher achievement than the students taught Physics through lecture method.

DELIMITATIONS OF THE STUDY:

1. The study could be conducted on several classes but it has been confined only to Xth class only.
2. The study was conducted in the subject of Physics and only two chapters were covered.
3. The training exercises in gaming could be extended for a longer period but the duration of the experiment was delimited to three weeks only.
4. The sample has also been restricted to 52 pupils.

DESIGN AND PROCEDURE:

DESIGN

In the present study Pre-Test and Post-test control group designs was employed. There were two groups of students- One experimental and other control group. The pupil achievement was the criterion variable. The study was performed inh three stages:-

1) Pre Test Stage
2) Experimental treatment Stage
3) Post-test stage.

SAMPLE

The Sample consisted of 52 students studying in the Xth class of Vidya Bhawan High School, Rohtak and Shiva High School, Rohtak. There were two groups, one experimental and control group

TOOLS

Achievement test made by the investigator to measure achievement in Physics.

EXPERIMENTAL TREATMENT

[illegible]

After administration of the test, teaching of Physics through gaming was the experimental treatment. For this the chapters from the text-book of Physics of the 10th class were selected. A school period of 40 minutes was utilized for teaching. The same two chapters were taught to the control group by the investigator utilizing the same time limit by following lecture method.

MODE OF GAMING -

1) Divided the experimental group into two teams A & B.
2) Each group contained 5 students.
3) They were made to sit in a face to face position with the judge in between them.
4) Rest of students were made to sit on the back benches and advised not speak during the gaming.
5) Roles of scorer, time keeper, judge, observers, recorder etc. were alloted to some students.
6) Question No. I was asked to team A and then to team B and so on.
7) After the gaming is over, scoring was done and winner announced

STATISTICAL ANALYSIS

The main statistical technique employed is the use of 't'- test. The test of the significance of the difference between two means is known as 't'- test keeping in view the objective and of the study the mean standard deviation and 't' value were employed for testing the significance of differences between the means of scores of students achievement

test for Pre-test, Post-test and gain scores.

ANALYSIS AND DISCUSSION :

Result obtained were analysed and interpreted based on the objective of the present study i.e. the effect of gaming and lecture method in relation to pupil achievement in Physics. Pupils taught Physics through gaming have shown significantly higher gain in the achievement than the pupils taught Physics through lecture method.

EFFECT OF GAMING ON ACHIEVEMENT OF STUDENTS IN PHYSICS

In order to observe the achievement of the student in Physics, two groups of 10th class were taught by the lecture method and the experimental group was taught throug gaming. It was found that the mean of it results at the Pre-test stage did not differ significantly. Achievement in both the groups is same. After the treatment at the Post-test stage it was found that the achievement of the experimental group was higher than the achievement of the control group.

CONCLUSIONS AND IMPLICATIONS

CONCLUSIONS

From the present study, it is concluded that studen benefit more by the gaming method as far as their achievement is concerned.

EDUCATIONAL IMPLICATIONS

The present study has implications for research in education.

1. Training in gaming exercise increases in pupil participation in class room interaction.
2. The present study has been confined to process variables only, it will be useful to study its effect on pupil learning outcomes, which is ultimate objectives of teaching.

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APPENDIX

*1 TRY - OUT TEST

2. ITEM ANALYSIS OF TRY - OUT TEST

3. COACHING EXERCISES

4. FINAL TEST

5. KEY TO FINAL TEST

6. SCORES OF ACHIEVEMENT TEST

.-.-.-.-.-.

1. TRY-OUT TEST:

भौतिकी में वस्तुविष्ठ प्रश्न परीक्षा

सामान्य निर्देश:-

1- यह प्रश्न पत्र दो भागों में विभाजित है:
विभाग"क" और विभाग "ख"

2- विभाग "क" और विभाग "ख" में वस्तुनिष्ठ बहुविकल्पी और रिक्त स्थान प्रश्न दिए गए है ।

3- दोनो विभागों के लिए 50 मिन्ट का समय दिया गया है ।

4- विभाग "क" तथा "ख" में सभी प्रश्न अनिवार्य है ।

स्कूल का नाम --

छात्र का नाम --

कक्षा ---------------- तिथि ---------------- रोल-नं0 ------

विभाग"क"

निर्देश:-

1- पहले प्रश्न से आरम्भ कीजिए और क्रमशः उतर दिजिए ।

2- सभी प्रश्नों के लिए एक-एक अंक निर्धारित है ।

बहु विकल्पीय प्रश्न:-

निर्देश:- यहाँ पर बहु विकल्पीय प्रश्नों के कई संभावित उत्तर दिये गये है । सब से अधिक सही उत्तर के सामने सही (✓) का निशान लगाईये –

उदाहरण:- न्यूटन की गति के नियम होते है -

(1) 4 [✓ (2) 3] (3) 2 (4) 1

1- बल की परिभाषा है :-

(1) संहति×त्वरण (2) त्वरण× वेग

(3) संहति × वेग (4) त्वरण/संहति

2- बल का गुरूत्वीय मात्रक होता है -

(1) डाइन (2) पाउण्डल

(3) न्यूटन (4) किलोग्राम वेट

3- एक किलोग्राम वेट बराबर होता है :

(1) 9·8 न्यूटन (2) 10^5 डाइन

(3) 980 डाइन (4) 9·8 पाउण्डल

4- बल के गुरूत्वीय मात्रकों की संख्या है :-

(1) 2 (2) 1 (3) 6 (4) 3·

5- बल को निम्नलिखित चिन्ह द्वारा प्रदर्शित किया जाता है -

(1) (2) (3) (4)

6- गति के नियमों का अध्ययन किया था :

(1) रदरफोर्ड ने (2) डाल्टन ने (3) न्यूटन ने (4) थामसन ने ।

7- एक जूल बराबर होता है :

(1) 10^7 डाइन (2) 10^7 अर्ग (3) 10^5 डाइन

(4) 9·8 न्यूटन ।

8- एक किलोवाट बराबर होता है :

(1) 10^5 वाट (2) 10^3 वाट (3) 10^5 अश्व शक्ति
(4) 980 डाइन ।

9- संवेग से अभिप्राय है :-

(1) बल × संहति (2) संहति × त्वरण
(3) संहति × वेग (4) बल × वेग

10- ग्राम वेट के नापने की इकाई निम्नलिखित प्रणाली में है:-

(1) एम० के० एस० प्राणाली (2) सी० जी० एस० प्रणाली
(3) एफ० पी० एस० प्रणाली (3) कोई नहीं

11- डाइन परम मात्रक होता है:-

(1) बल का (2) संहति का
(3) संवेग का (4) त्वरण का

12- एक ग्राम सेंटीमीटर बराबर है :-

(1) 980 अर्ग (2) 980 डाइन (3) 10^2 से० मी०
(4) 10^5 से० मी०

13- पाउण्डल बल की नापने की इकाई निम्नलिखित प्रणाली में है :-

(1) सी० जी० एस० प्रणाली (2) एफ० पी० एस० प्रणाली
(3) एम० के० एस० प्राणाली (4) कोई नहीं

14- न्यूटन की गति का वास्तविक नियम है/-

(1) पहला (2) दूसरा (3) तीसरा (4) ये सभी ।

15- शक्ति से अभिप्राय है :-

(1) बल/दूरी (2) बल×दूरी

(3) कार्य/समय (4) कार्य×समय

16- कार्य से अभिप्राय: है :-

(1) कार्य × समय (2) कार्य/समय

(3) बल × दूरी (4) दूरी× समय

छ- निम्नलिखित में रिक्त स्थान भरो :-

17- संवेग = ---------- ------------ से मापा जाता है ।

18- क्रिया और प्रतिक्रिया --------तथा--------होते हैं ।

19- डाइन ----------पद्धति में --------- का मात्रक है ।

20- जड़त्व-- --------प्रकार का होता है ।

21- बल = ------------ -------------

22- ------- ---------- के बिना क्रिया असम्भव है ।

23- एक ग्राम वेट=----------------- डाइन ।

24- एक न्यूटन = ---------------------- ।

25- कार्य के मात्रक अर्ग, ग्राम सेंटी मीटर तथा ----- होते हैं ।

26- किसी वस्तु के कार्य करने की दर को --------- कहते हैं ।

27- क्रिकेट की गेंद को पकड़ते समय हाथों को -------खींचना पड़ता है ।

28- गति के नियमों की संख्या ---------- है ।

29- चिकने खम्भे पर चढ़ना ------------- है ।

30- गति का -----------नियम ही वास्तविक नियम है ।

31- पानी में तैरते समय हम पानी को ------------ धकेलते है ।

32- $v = u + $ -------

33 $S = $ -------- + ----------

34 $v^2 - $ -------- $= 2as$

35- $F = $ --------

विभाग - ख

(क) बहु विकल्पीय प्रश्न:- सबसे अधिक ठीक उत्तर के सामने सही (--/) का निशान लगाईये ----

36- आक्सीजन का परमाणु क्रमांक होता है ------

(1) 6 (2) 7 (3) 11 (4) 8

37- निम्न में से नाभिक के बाहर के भाग में कण उपस्थित होता है ।

(1) न्यूट्रान (2) इलेक्ट्रान (3) प्रोट्रान (4) पोजिट्रान

38- निम्न में से कौन सा कण सबसे भारी है :-

(1) प्रोट्रान (2) इलेक्ट्रान (3) न्यूट्रान (4) ये सभी ।

39- इलेक्ट्रान का भार हाईड्रोजन परमाणु के भार का निम्नलिखित भाग होता है :-

(1) 1 (2) 1/2 (3) 1/1836वाँ (4) 1/1845वाँ

40- परमाणु शक्ति का स्त्रोत होता है :-

(1) इलेक्ट्रान में (2) नाभिक में (3) प्रोट्रान में (4) न्यूट्रान में ।

41- हाईड्रोजन के नाभिक में कण होते है :-

(1) 1 (2) 2 (3) 4 (4) कोई नहीं

42- गंधक का परमाणु भार होता है :-

(1) 30 (2) 31 (3) 32 (4) 35

43- परमाणु के नाभिक में निम्नलिखित कण होते है —

(1) प्रोट्रान और न्यूट्रान (2) प्रोट्रान और इलेक्ट्रान

(3) न्यूट्रान और इलेक्ट्रान (4) प्रोट्रान, न्यूट्रान और इलेक्ट्रान ।

44- परमाणु भट्टी में निम्नलिखित छड़ का प्रयोग होता है -

(1) कैडमियम (2) यूरेनियम (3) कैलेशयम

(4) सोडियम ।

45- नाभिक का व्यास परमाणु के व्यास का निम्नलिखित भाग होता है -----

(1) 10^{-3} (2) 10^{-5} (3) 1 (4) 1/2

46- निम्नलिखित में से सबसे हलका कण होता है :-

(1) इलेक्ट्रान (2) प्रोट्रान (3) हाईड्रोजन

(4) हीलियम

47- नाभिक के चारों ओर कौन सा कण चक्कर लगाता है ---

(1) इलेक्ट्रान (2) प्रोट्रान (3) न्यूट्रान (4) ये सभी

48- नाभिक विखण्डन में उर्जा क्यों उत्पन्न होती है :-

(1) कुछ संहति उर्जा में परिवर्तित हो जाती है ।

(2) इलेक्ट्रान अपना स्थान बदलते हैं ।

(3) न्यूट्रान अलग हो जाते है ।

(4) इनमें से कोई नहीं ।

~~49-~~

49- परमाणु विद्युत उदासीन क्यों होता है :-

(1) इलेक्ट्रान और प्रोट्रान की संख्या सामान होती है ।

(2) न्यूट्रान अधिक होते है ।

(3) न्यूट्रान और प्रोटान मिलकर उदासीन बना देते है ।

(4) इनमें से कोई नहीं ।

निम्नलिखित में खाली स्थान भरों :-

50- इलेक्ट्रान पर हवाई ----------आवेश होता है ।

51- गन्धक का परमाणुभार --------होता है ।

52- नाभिक के बाहर के कणों को ------कहते हैं ।

53- प्रमाणु भार = प्रोट्रोनों की संख्या + ----- की संख्या

54- नाइट्रोजन का परमणु क्रमांक -------- होता है ।

55- प्रोट्रान को --------- द्वारा प्रदर्शित करते है ।

56- पहले इलेक्ट्रान कक्षा में ---------- इलेक्ट्रान होते है ।

57- नाइट्रोजन का परमाणु भार -------- होता है ।

58- चौथी इलेक्ट्रान कक्षा में ---------- इलेक्ट्रोन होते है ।

59- परमाणु-------- प्रकार के सूक्ष्म तथा मौलिक कणों से बना होता है ।

60- कार्बन अणु के नाभिक में ---------प्रोट्रान होते है ।

61- आक्सीजन अणु के नाभिक में --------प्रोट्रान होते है ।

62- परमाणु के नाभि में प्रोट्रान तथा -------होते है ।

63- यूरेनियम का भार ------------- होता है ।

64- इलेक्ट्रान को ----------द्वारा प्रदर्शित करते है ।

65- प्रोट्रान की संहति इलेक्ट्रान की संहति-से होती है ।

66- परमाणु के भार का कारण ------------ है ।

67- सबसे हल्की गैस ---------------- होती है ।

68- नाभिक की खोज ------------ वैज्ञानिक ने की ।

69- परमाणु के केन्द्रीय भाग का नाम ---------- है ।

70- सबसे भारी कण ---------------- होता है ।

2. ITEM ANALYSIS

Item No.	Difficulty Value (dv)	Discrimination Value (rb)
1.	.43	.32
*2.	.09	.15
3.	.36	.31
4.	.39	.25
5.	.32	.35
6.	.37	.34
*7.	.07	.24
*8.	.61	.16
9.	.40	.36
10.	.31	.53
11.	.34	.37
*12.	.64	.13
13.	.33	.36
14.	.38	.38
15.	.50	.40
16.	.47	.27
17.	.37	.35
18.	.42	.32
*19.	.05	.13
20.	.31	.37

*21.	.71	.08
22.	.48	.55
23.	.41	.54
24.	.46	.61
25.	.38	.28
*26.	.63	.11
*27.	.02	.16
28.	.49	.60
*29.	.60	.12
30.	.31	.26
*31.	.64	.10
32.	.31	.27
33.	.33	.26
34.	.40	.48
*35.	.06	.19
36.	.38	.27
37.	.33	.29
38.	.45	.27
39.	.31	.28
40.	.25	.34
*41.	.63	.17
*42.	.66	.07
43.	.32	.27
*44.	.66	.18
*45.	.05	.07
46.	.30	.25
47.	.31	.29

48.	.40	.30
49.	.49	.55
50.	.33	.27
*51.	.37	.44
52.	.78	.10
53.	.42	.34
*54.	.72	.09
55.	.36	.31
56.	.41	.42
*57.	.68	.13
58.	.46	.55
59.	.32	.28
*60.	.69	.01
*61.	.73	.07
62.	.50	.51
*63.	.66	.51
64.	.44	.31
65.	.46	.38
66.	.38	.42
67.	.49	.50
68.	.31	.27
69.	.48	.44
70.	.32	.65

Gaming Exercise Number 1.

प्रश्न 1- बल की परिभाषा क्या है ।

उतर- बल वह बाहरी कार्यकर्ता है जो किसी वस्तु की स्थिर या गति की अवस्था को बदल दे या बदलने का प्रयत्न करें ।

प्रश्न-2 संवेग किसे कहते है ।

उतर- किसी वस्तु की गति की मात्रा को संवेग कहते है ।

प्रश्न- 3 एक किलोग्राम वेट किसके बराबर होता है ।

उतर- 9·8 न्यूटन ।

प्रश्न -4 बल के कितने मात्रक होते है ।

उतर- बल के दो मात्रक होते है ।

प्रश्न -5 जड़त्व कितने प्रकार का होता है ।

उतर- जड़त्व तीन प्रकार का होता है ।

प्रश्न-6 गति के नियमों की खोज किसने की ?

उतर- गति के नियमों की खोज न्यूटन ने की ।

प्रश्न - 7 न्यूटन की गति के कितने नियम है ?

उतर- न्यूटन की गति के तीन नियम है ।

प्रश्न - 8 संहति का सूत्र क्या है ?

उतर- बल/त्वरण ।

प्रश्न- 9 गति का वास्तविक नियम कौन सा है ।

उतर- दूसरा

प्रश्न -10 एक ग्राम सेंटीमीटर किसके बराबर होता है ?

उतर 980 अर्ग

प्रश्न - 11 कार्य का सूत्र क्या है ?

उतर - बल दूरी ।

प्रश्न नं0 12- कार्य के मात्रक कौन से है ।

उतर - अर्ग , ग्राम सेंटीमीटर और जूल ।

प्रश्न नं0 13 - 1 किलोवाट किसके बराबर होता है ।

उतर - 1000 वाट

Gaming Exercise No. 2

प्रश्न - 1- गति के दूसरे नियम की परिभाषा बताओ ।

उत्तर- किसी वस्तु के संवेग के परिवर्तन की दर उस पर लगाए हुए बल के समानुपात होती है तथा उसी दिशा में होती है जिस दिशा में बल लगाया जाता है ।

प्रश्न - 2- एक जूल किसके बराबर होता है ।

उत्तर- 10^7 अर्ग

प्रश्न- 3- अर्ग किसे कहते है ?

उत्तर- अर्ग वह कार्य है जो एक डाइन बल लगाने से किसी वस्तु को अपनी दिशा में एक सें0 मी0 चलाता है ।

प्रश्न - 4- शक्ति का मात्रक क्या है ।

उत्तर- शक्ति का मात्रक वाट है ।

प्रश्न- 5- 1 अश्व शक्ति किसके बराबर है ?

उत्तर- 746 वाट ।

प्रश्न 6- 1 न्यूटन किसके बराबर है ?।

उत्तर- 10^5 डाइन

प्रश्न -7- कार्य के मात्रकों की संख्या क्या है ?

उत्तर- कार्य के मात्रकों की संख्या 3 है ।

प्रश्न-8- संवेग कैसे मापा जाता है ?

उत्तर- संहित × वेग ।

प्रश्न-9- एक ग्राम वेट किसके बराबर है ?।

उत्तर- 980 डाइन

प्रश्न-10- बल के गुरुत्वीय मात्रक क्या है ?

उत्तर- ग्राम वेट, पाउण्ड वेट, किलो ग्रा0 वेट ।

प्रश्न-11- संवेग किसे कहते है ?

उत्तर- किसी वस्तु की गति की मात्रा को संवेग कहते है ।

प्रश्न-12- वेग किसे कहते है ?

उत्तर- किसी वस्तु की किसी निश्चित दिशा में गति की दर को वेग कहते है ।

Gaming Exercise No. 3

प्रश्न-1- पाउण्ड वेट किसे कहते है ?

उत्तर- यह वह बल है जो एक पौंड सहंति वाली वस्तु में 32 फुट प्रति से० ^{2} का त्वरण उत्पन्न कर दें।

प्रश्न-2- गति का तीसरा नियम क्या हैं ?

उत्तर- क्रिया और प्रति क्रिया समान तथा विपरीत होती है ।

प्रश्न-3- बल किसके बराबर होता है ?

उत्तर- सहंति × त्वरण ।

प्रश्न-4- उर्जा किसे कहते है ?

उत्तर- किसी वस्तु के कार्य करने की क्षमता को उर्जा कहते है ।

प्रश्न-5- डाइन किसका मात्रक है ?

उत्तर- बल का

प्रश्न-6- क्या किसी वस्तु का भार प्रत्येक स्थान पर समान होता है

उत्तर- नही ।

प्रश्न-7- बन्दूक गोली छोडते समय आगे को धक्का लगाती है या पीछे को ?

~~प्रश्न-8-~~
उत्तर- पीछे की ओर ।

प्रश्न-9- संवेग किसे कहते है ?

उत्तर- किसी वस्तु की गति की मात्रा को संवेग कहते है ।

प्रश्न-10- संवेग के मात्रक को क्या कहते है ?

उत्तर- संवेग के मात्रक को सी० जी० एस० का मात्रक कहते है ।

प्रश्न-11- त्वरण का सूत्र क्या है ?

उत्तर- बल/सहंति ।

प्रश्न-12- शक्ति का सूत्र क्या है ।

उत्तर- कार्य/समय ।

प्रश्न-13- एक ग्राम भार किसके बराबर होता हैं ।

उत्तर- 980 डाइन ।

Gaming Exercise No. 4

प्रश्न-1- बल के गुरूत्वीय मात्रकों की संख्या कितनी होती है ?

उतर- बल के गुरूत्वीय मात्राओं की संख्या तीन होती है ।

प्रश्न -2- जड़त्व कितने प्रकार का होता है ?

उतर- जड़त्व तीन प्रकार का होता है ।

प्रश्न-3- उर्जा किसे कहते है ?

उतर- किसी वस्तु के कार्य करने की क्षमता को उर्जा कहते है ।

प्रश्न-4- पाउण्डल बल के नापने की ईकाई ~~[illegible]~~ किस प्रणाली गी है ।

उतर- एफ0 पी0 एस0 प्रणाली है ।

प्रश्न-5- त्वरण का सूत्र क्या है ?

उतर- बल/सहंति ?

प्रश्न-6- डाइन किसे कहते है ?

उतर- डाइन वह बल ~~[illegible]~~ है जो एक ग्राम सहंति वाली वस्तु में ~~[illegible]~~ एक सै0 मी0 प्रति सै0 प्रति सै0 का त्वरण पैदा करता है ।

प्रश्न-7- संवेग किसे कहते है ?

उतर- किसी वस्तु की गति की मात्रा को संगेग कहते है ।

प्रश्न-8- वेग किसे कहते है ?

उतर- किसी वस्तु की किसी निश्चत दिशा में गति की दर को वेग कहते है ।

प्रश्न -9- बल का सूत्र क्या है ?

उतर- सहंति × त्वरण ।

प्रश्न-10- क्या गति का दूसरा नियम ही वास्तविक नियम है ?

उतर- हाँ, गति का दूसरा नियम ही वास्तविक नियम है ?

प्रश्न-11- कार्य का सूत्र क्या है ।

उतर- बल × दूरी ।

प्रश्न-12- रिक्त स्थान भरो :

Training Exercise No. 5

प्रश्न-1- अणु की परिभाषा क्या है ।

उत्तर- अणु किसी तत्व या यौगिक का वह छोटे से छोटा कण होता है । जो स्वतन्त्र रूप से विद्यमान रह सके ।

प्रश्न-2- न्यूट्रान पर कौन सा आवेश होता है ?

उत्तर- न्यूट्रान पर कोई आवेश नही होता है ।

प्रश्न-3- परमाणु के केन्द्रीय भाग का नाम बताओं ?

उत्तर- नाभिक ।

प्रश्न-4- न्यूट्रान का भार किसके बराबर होता है ?

उत्तर प्रोटोन के भार के बराबर ।

प्रश्न-5- परमाणु के मौलिक कणों के नाम बताओं ?

उत्तर- इलेक्ट्रान, प्रोटोन, न्यूट्रान ।

प्रश्न-6- किसी कक्षा में इलेक्ट्रानों की संख्या कितनी होती है ?

उत्तर- $2n^2$ के बराबर । n = कक्षा की क्रम संख्या ।

प्रश्न-7- हाईड्रोजन का प्रमाणु भार कितना माना गया है ?

उत्तर- 1·008 ।

प्रश्न-8- परमाणु क्रमांक किसे कहते हैं ।

उत्तर- किसी [illegible] परमाणु [illegible] के नाभिक की धनात्मक आवेश संख्या को उसका परमाणु क्रमांक कहते हैं ।

प्रश्न-9- इलेक्ट्रान का भार कितना होता है ?

उत्तर- 1/1845 आफ हाईड्रोजन एटम ।

प्रश्न-10- नाभिक की खोज किसने की ?

उत्तर- रदरफोर्ड ने ।

प्रश्न-11- नाइट्रोजन का परमाणु क्रमांक क्या है ।

उत्तर- 7

प्रश्न-12- प्रोट्रान पर कौन सा आवेश होता है ?

उत्तर- धन आवेश ।

Gaming Exercise No. 6

प्रश्न–1– सबसे हल्की गैस का नाम लिखो ?

उत्तर– हाइड्रोजन ।

प्रश्न–2– क्लोरीन का परमाणु भार कितना होता है ?

उत्तर– 35

प्रश्न–3– नाइट्रोजन के नाभिक में कितने प्रोट्रान होते है ?

उत्तर– 7

प्रश्न–4– न्यूट्रान का भार किसके बराबर होता है ।

उत्तर– न्यूट्रान का भार प्रोट्रोन के भार के बराबर होता है ।

प्रश्न–5– परमाणु कितने प्रकार के सूक्ष्म तथा मौलिक कणों से बना होता है ?

उत्तर– तीन प्रकार के कणों से ।

प्रश्न –6– इलेक्ट्रान पर कौन सा आवेश होता है ।

उत्तर– ऋण आवेश ।

प्रश्न– 7– नाभिक के बाहर के कणों को क्या कहते है ।

उत्तर– इलेक्ट्रान ।

प्रश्न–8– प्रोट्रोन को किस चिन्ह द्वारा प्रदर्शित करते है ।

उत्तर– पी0 द्वारा ।

प्रश्न–9– क्लोरीन का परमाणु भार कितना होता है ?

उत्तर– 35

प्रश्न10– परमाणु के भार का क्या कारण है ?

उत्तर– नाभिकीय कण ।

प्रश्न–11– सबसे हल्के कण का नाम लिखों ?

उत्तर– इलेक्ट्रान ।

प्रश्न–12– परमाणु भट्टी में किस छड़ का प्रयोग किया जाता है ?

उत्तर– कैडमियम छड़ का ।

प्रश्न–13– परमाणु शक्ति का स्त्रोत कहां होता है ।

उत्तर– नाभिक में ।

Gaming Exercise No. 7

प्रश्न-1 नाभिक विखण्डन में उर्जा क्यों उत्पन्न होती है ?

उत्तर- कुछ संहति उर्जा में परिवर्तित हो जाती है ।

प्रश्न-2 परमाणु में न्यूट्रानों की संख्या कितनी होती है ?

उत्तर- परमाणु में न्यूट्रानों की संख्या परमाणु भार और परमाणु क्रमांक के अन्तर के समान होती है ।

प्रश्न-3 सबसे हल्का कण कौन सा होता है ।

उत्तर- इलैक्ट्रान

प्रश्न-4 परमाणु के भार का क्या कारण होता है ?

उत्तर- नाभिकीय कण ।

प्रश्न-5 सबसे हल्की गैस कौन सी होती है ?

उत्तर- हाईड्रोजन ।

प्रश्न-6 इलैक्ट्रोन पर कौन सा आवेश होता है ?

उत्तर- इलैक्ट्रान पर ऋण आवेश होता है ।

प्रश्न-7 अणु की परिभाषा क्या है ?

उत्तर- अणु किसी तत्व या यौगिक का वह छोटे से छोटा कण होता है जो स्वतन्त्र रूप से विद्यमान रह सके ।

प्रश्न-8 अणु और परमाणु में क्या अन्तर है ?

उत्तर- अणु स्वतन्त्र रूप से विद्यमान रह सकता है जबकि परमाणु नहीं रह सकता ।

प्रश्न-9 क्लोरीन का परमाणु क्रमांक कितनाहोता है ?

उत्तर- 17

प्रश्न-10 परमाणु के केन्द्रीय भाग का नाम बताओ ?

उत्तर- नाभिक ।

प्रश्न-11 हाईड्रोजन के नाभिक में कितने प्रोटॉन होते हैं?

उत्तर- एक

प्रश्न-12 हाईड्रोजन का भार कितना माना गया है ?

उत्तर- 1·008

Gaming Exercise No. 8

प्रश्न-1 यूरेनियम का परमाणु भार कितना होता है ?

उतर- 235

प्रश्न-2 किसी परमाणु की नाभिक में 9 न्यूट्रान तथा 10 प्रोटान है उसका परमाणु भार तथा परमाणु क्रमांक बताओ ?

उतर-3 परमाणु क्रमांक = 10 , परमाणु भार = 10 + 9 = 19

प्रश्न-3 न्यूट्रान पर कौन सा आवेश होता है ?

उतर- न्यूट्रान पर कोई आवेश नहीं होता ।

प्रश्न-4 रचनात्मक सूत्रकिसे कहते हैं ?

उतर- ऐसा सूत्र जिससे यह ज्ञात हो कि अणु में विभिन्न परमाणु एक दूसरे के साथ किस प्रकार संयुक्त हैं ।

प्रश्न-5 प्रोटान को किस चिन्ह द्वारा प्रदर्शित करते हैं ?

उतर- पी द्वारा

प्रश्न-6 नाभिक के बाहर कौन से कण चक्कर लगाते हैं ।

उतर- इलेक्ट्रान

प्रश्न-7 परमाणु बम्ब की खोज किस वैज्ञानिक ने की ?

उतर- परमाणु बम्ब की खोज जर्मनी के वैज्ञानिक आटोहान ने की थी ।

प्रश्न-8 परमाणु की संरचना कितने कणों से होती है ?

उतर- परमाणु की संरचना तीन कणों से मिलकर होती है ।

प्रश्न-9 नाईट्रोजन का परमाणु क्रमांक कितना होता है ?

उतर- 7

प्रश्न-10 इलेक्ट्रान को किस चिन्ह द्वारा प्रदर्शित करते हैं ?

उतर- ई द्वारा

प्रश्न-11 परमाणु के मौलिक कणों के नाम बताओ ?

उतर- इलेक्ट्रान, प्रोटॉन और न्यूट्रान ।

प्रश्न-12 परमाणु क्रमांक किसे कहतेहैं ?

उतर- किसी परमाणु के नाभिक की धनात्मक आवेश संख्या को परमाणु क्रमांक कहते है ।

4. FINALISED TEST :

भौतिकी में वस्तुनिष्ठ प्रश्न परीक्षा

सामान्य निर्देश :-

1. यह प्रश्न पत्र दो भागों में विभाजित है "क" और "ख" विभाग
2. विभाग क और विभाग ख में वस्तुनिष्ठ बहुविकल्पी और रिक्त स्थान प्रश्न दिए गए हैं ।
3. दोनों विभागों के लिए 50 मिन्ट का समय दिया गया है ।

स्कूल का नाम --

छात्र का नाम --

कक्षा ------------ तिथि ------------ रोल नं0 ------------

निर्देश :

1. पहले प्रश्न से आरम्भ कीजिए और क्रमशः उत्तर दीजिए ।
2. सभी प्रश्नों के लिए एक एक अंक निर्धारित है ।

विभाग - क

बहु विकल्पीय प्रश्न :-

यहां पर बहु विकल्पीय प्रश्नों के कई संभावित उत्तर दिये गये है । सब से अधिक सही उत्तर के सामने सही ( ) का निशान लगाईए ।

उदाहरण : न्यूटन की गति के नियम होते है :

(1) 4 -- ✓(2) 3 (3) 2 (4) 1

1. बल की परिभाषा है :-

(1) संहति x त्वरण (2) त्वरण x वेग

(3) संहति x वेग (4) त्वरण / संहति

2. एक किलोग्राम वेट बराबर होता है –
(1) 9.8 न्यूटन (2) 10^5 डाइन
(3) 980 डाइन (4) 9.8 पाउण्डल

3. बल के गुरुत्वीयमात्रकों की संख्या है –
(1) 2 (2) 1 (3) 6 (4) 3

4. बल को निम्नलिखित चिन्ह द्वारा प्रदर्शित किया जाता है :–
(1) F (2) g (3) G (4) M

5. गति के नियमों का अध्ययन किया था –
(1) रदरफोर्ड ने (2) डाल्टन ने (3) न्यूटन ने (4) थामसन ने

6. संवेग से अभिप्राय है –
(1) बल × संहति (2) संहति × त्वरण
(3) संहति × वेग (4) बल × वेग

7. ग्राम वेट के नापने की इकाई निम्नलिखित प्रणाली में है –
(1) एम0 के0 एस0 प्रणाली (2) सी0जी0एस0 प्रणाली
(3) एफ0पी0एस0 प्रणाली (4) इनमें से कोई नहीं

8. डाइन परम मात्रक होता है :–
(1) बल का (2) संहति का (3) संवेग का (4) त्वरण का

9. पाउण्डल बल को नापने की इकाई निम्नलिखित प्रणाली में है –
(1) सी0जी0 एस0 प्रणाली (2) एफ0पी0 एस0 प्रणाली
(3) एम0के0 एस0 प्रणाली (4) इनमें से कोई भी नहीं

10. न्यूटन की गति का वास्तविक नियम है –
(1) पहला (2) दूसरा (3) तीसरा (4) ये सभी

11. कार्य से अभिप्राय है :–
(1) कार्य × समय (2) कार्य / समय
(3) बल × दूरी (4) दूरी × समय

12. शक्ति से अभिप्राय है :-

(1) बल /दूरी (2) बल दूरी (3) कार्य/समय

(4) कार्य × समय

ख) निम्नलिखित में रिक्त स्थान भरो -

13. संवेग = ---------- ---------- से मापा जाता है ।

14. क्रिया और प्रतिक्रिया ----------तथा ----------होते है ।

15 गुरुत्व----------प्रकार का होता है ।

16. ---------- के बिना क्रिया असम्भव है ।

17. एक ग्राम वेट = ---------- डाइन

18. एक न्यूटन = ----------

19. कार्य के मात्रक अर्ग, ग्राम सेंटीमीटर तथा ----------होते है ।

20. गति के नियमों की संख्या----------है ।

21. गति का----------नियम ही वास्तविक नियम है ।

22. $v = u + \_\_\_\_\_\_ \times t$

23. $s = \_\_\_\_\_\_ + \_\_\_\_\_\_ at^2$

24. $v^2 - \_\_\_\_\_\_ = 2aS$.

विभाग ख

(क) बहु विकल्पीय प्रश्न:- सबसे अधिक ठीक उत्तर के सामने सही(का निशान लगाइये ।

25. आक्सीजन का परमाणु क्रमांक होता है -

(1) 6 (2) 7 (3) 11 (4) 8

26. निम्न मे से नाभिक के बाहर के भाग में कण उपस्थित होता है -

(1) न्यूट्रान (2) इलेक्ट्रान (3) प्रोटॉन (4) पोजिट्रान

27. निम्न में से कौन सा कण सबसे भारी है :

(1) प्रोटान (2) इलेक्ट्रान (3) न्यूट्रान (4) ये सभी

28. इलेक्ट्रान का भार हाइड्रोजन परमाणु के भार का निम्नलिखित भाग होता है -

(1) 1 (2) 1/2 (3) 1/1836 (4) 1/1845

29. परमाणु धारित्त [illegible] होता है –

(1) इलेक्ट्रान में (2) नाभिक में (3) प्रोटान में (4) न्यूट्रान में

30. परमाणु के नाभिक में निम्नलिखित कण होते है :-

(1) प्रोटान और न्यूट्रान (2) प्रोटान और इलेक्ट्रान

(3) न्यूट्रान और इलेक्ट्रान (4) प्रोटान, न्यूट्रान और इलेक्ट्रान

31. निम्नलिखित में सबसे हल्का कण होता है –

(1) इलेक्ट्रान (2) प्रोटान (3) हाईड्रोजन (4) हीलियम

32. नाभिक के चारों ओर कौन सा कण चक्कर लगाता है –

(1) इलेक्ट्रान (2) प्रोटान (3) न्यूट्रान (4) ये सभी

33. नाभिक विखण्डन में उर्जा क्यो उत्पन्न होती है –

(1) कुछ संहीत उर्जा में परिवर्तित हो जाती है ।

(2) इलेक्ट्रान अपना स्थान बदलते हैं ।

(3) न्यूट्रान अलग हो जाते हैं ।

(4) इनमें से कोई नहीं ।

34. परमाणु विद्युत उदासीन क्यों होताहै ?

(1) इलेक्ट्रान और प्रोटान की संख्या समान होती है ।

(2) न्यूट्रान अधिक होते है ।

(3) प्रोटान और न्यूट्रान मिलकर उदासीन बना देते हैं ।

(4) इनमें से कोई नहीं ।

ख) निम्नलिखित में खाली स्थान भरो –

35. इलेक्ट्रोनों पर इकाई----------आवेश होता है ।

36. परमाणु भार = प्रोटोनो की संख्या + -------की संख्या ।

37. नाभिक के बाहर के कणों को -----------कहते है ।

38. प्रोटान को ----------द्वारा प्रदर्शित करते हैं ।

39. [illegible]

पहले इलेक्ट्रान कक्षा में ---------इलेक्ट्रान होते हैं ।

40. चौथी इलेक्ट्रान कक्षा में----------इलेक्ट्रान होते हैं ।

41. परमाणु ----------प्रकार के सूक्ष्म तथा मौलिक कणों से बना होता है ।

42. परमाणु के नाभिक में प्रोटान तथा------------होते हैं ।

43. इलेक्ट्रान को ----------------द्वारा प्रदर्शित करते हैं ।

44. प्रोटान की संहति इलेक्ट्रान की संहति से---------होती है ।

45. प्ररमाणु के भार का कारण ---------- है ।

46. सबसे हल्की गैस------------होती है ।

47. नाभिक की खोज ----------वैज्ञानिक ने की ।

48. परमाणु के केन्द्रीय भाग का नाम-----------है ।

49. सबसे भारी कण------------होता है ।

50. बल = ---------- ------------

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5· KEY FUR FINAL TEST

1·	1	2·	4
3·	1	4·	3
5·	1	6·	2
7·	2	8·	3
9·	3	10·	2
11·	3	12·	4
13·	संहति वेग	14·	समान, विपरीत
15·	तीन	16·	प्रतिक्रिया
[illegible]		17·	980 डाइन
18·	10^5 डाइन	19·	जूल
20·	तीन	21·	दूसरा
22·	a	23·	ut , $\frac{1}{2}$
24·	u^2	25·	4
26·	2	27·	3
28·	4	29	2
30·	1	31·	1
32·	1	33·	1
34·	1	35·	ऋण
36·	न्यूट्रान की संख्या	37·	इलैक्ट्रान
38·	पी	39	2
40·	32	41·	3
42·	न्यूट्रान	43·	ई
44·	अधिक	45·	नाभिकीय कण
46·	हाईड्रोजन	47·	रदरफोर्ड
48·	नाभिक	49·	न्यूट्रान
50·	संहति × त्वरण		

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6. SCORES OF ACHIEVEMENT TEST

EXPERIMENTAL GROUP

Sr. No.	Pre-test	Post-test	Gain
1	27	37	10
2.	30.	40.	10.
3.	11	17	6
4.	15	28	13
5.	21	37	16
6.	22	34	12
7.	8	17	9
8.	36	45	9
9.	31	37	6
10.	35	46	11
11.	30	40	10
12.	17	30	13
13.	28	41	13
14.	21	37	16
15.	20	30	10
16.	22	27	5
17.	26	40	14
18.	16	21	5
19.	10	16	6
20.	8	12	4
21.	12	21	9
22.	25	43	18
23.	32	45	13
24.	23	38	15
25.	30	42	12
26.	12	23	11

SCORES OF [illegible] TEST

[illegible]

National Insti[illegible]
Library & [illegible]
Unit ([illegible] E.R.T.)
Acc. No. F16931
Date 30-6-88

Sr. No.	Pre-test	Post-test	Gain
1.	29	33	4
2.	27	32	5
3.	15	17	2
4.	19	22	3
5.	17	20	3
6.	16	20	4
7.	11	13	2
8.	30	35	5
9.	29	33	4
10.	31	37	6
11.	29	32	3
12.	25	28	3
13.	19	21	2
14.	22	23	1
15.	20	24	4
16.	20	24	4
17.	22	25	3
18.	13	18	5
19.	11	13	2
20.	10	9	-1
21.	12	15	3
22.	28	33	5
23.	23	26	3
24.	20	24	4
25.	31	37	6
26.	19	22	3